

Carevan-

Meds On Beds

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Abstract - Pervasive devices are becoming a part of peoples life daily. Smart devices are not only an aid to peoples life but also play a crucial part of physically challenged and aged people . With an increase in aging population and the financial difficulties of having a full time caregiver for every dependent person at home, the need for safe and independent mobility for them is required. Inorder to help them ,this project acts as a complete module to reduce their dependency on others. The paper deals with a creation of a genius wheel chair called carevan ,It consist of a wheel chair which converts itself to bed for increasing their comfort ,A Tabo-kit fitted to the right of the wheel chair to inform them about their medicine and make sure they have it and inform concerned people about it and insulin injector on the left to get their insulin injection in time.It is designed with a motive of increasing both their comfort and locomotion and also helps them to keep track of their health.

KeyWords: Carevan,Genius-wheelchair,wheelchair to bed,tabokit,insulin injector,comfort locomotion.

1.INTRODUCTION:

Smart devices are playing a vital role in our daily life. With developing technologies and inventions for aged and physically challenged people the genius wheel chair researches are getting rapidly popular. The wheelchair has been a hot topic of research since the last decade but there is no considerable output in the markets and those that fit in the definition of smart wheelchairs are not affordable by common people. Due to the advancement of the embedded system it has been highly efficient in satisfying the needs of the physically challenged and elderly people. Different wheel chairs are available to solve different kinds of problems of people. Today 524 million people are aged i.e. 8 percent of the total world population. By 2050, this number is expected to about 1.5 billion, representing 16 percent of the world's population, In that more than 20% of that aged population will have problem in movement. According to the statistics

There are over 27 million (2.7 Crore) people with disabilities out of which 5.4 million or 54 lakhs (54,36,826) have disability in movement in India.The health of people having disabilities and elderly are more in stake than the other people.

Previous works show interest in mostly on the locomotion part which mainly concentrates on the movemental comfort of the person on it ,it especially has certain features like fall detection accident preventions that can be referred from [3],[5],[6] and [7] which are now getting implemented in wheelchairs, The various works on semi automatic visions assistance can be studied in [2],[8],[12]. one one of the best methods of implementing a smart wheelchair is proposed in [1] but all these focus only on the movemental benefits of the user and not their health.

The proposed wheelchair (carevan) also is navigated by a touch screen android device which is connected via a bluetooth configuration . For certain people it can also be navigated using a voice control . The motors are driven by s motor driver circuit , the locomotion part is now over . the best part of carevan is that it helps not only in the locomotion but it also helps in maintaining track of their health .

The first thing the people on the wheelchair is their comfort so in those cases our carevan on the press of a button converts itself in to a bed and back to a chair when required so their comfort is increased, Secondly the other main concern of the people on the wheelchair is taking their medicines on time , so in the right side of our carevan there is a TABO-KIT which consist of their tablets so when the time arives it produces a buzzer sound until the medicine has been taken ,and the best part is it also displays the remaining count on the lcd. Thirdly the carevan consist of an insulin injector in the left which works on a threading mechanism , When the time arives it produces a beep sound then it comes forward and checks whether human is there with an Ir sensor and then inserts the insulin according to the particular level. So maintaining not only the movement but

also their health is our main concern, it is all controlled by a 89sf2 microcontroller and the programming part is done by the keil compiler .



Fig [1] . Prototype of Carevan

Carevan will help around 12.6 million people who suffer from mobility or physically challenged people.

The paper is divide into following sections . Session II deals with the system description , Session III deals with working of the system , Session IV shows the hardware and software systems ,Session V gives the conclusion of the paper,Session VI shows the future work .

2.SYSTEM DESCRIPTION:

The carevan can be differentiated into a set of four subsystem . Each subsystem follows and accomplishes the task is designed to it as showin in Fig[2] .

- Control system
- Conversion system
- Tabo-kit system
- Insulin injector system.

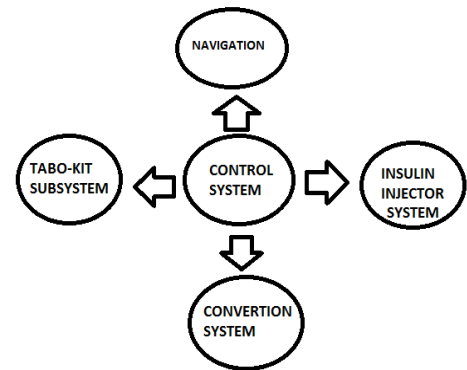
A.Control subsystem:

The control system is the center processing unit of the carevan. It consist of a microprocessor 89s52 embedded with a keil software.The control subsystem consists of the microcontroller and the operatingsystem ported on the microcontroller. The operating system is embedded into microcontroller and is responsible for the time predictable behavior of the system .It consists of four tasks:

- Conversion task
- LCD dispay task
- IR sensor task
- IRsensor 2 task

The main event driven task list is:

- IR sensor detecting the presence of human
- IR sensor to detect whether the tablet is taken



Fig[2]. Division into subsystem

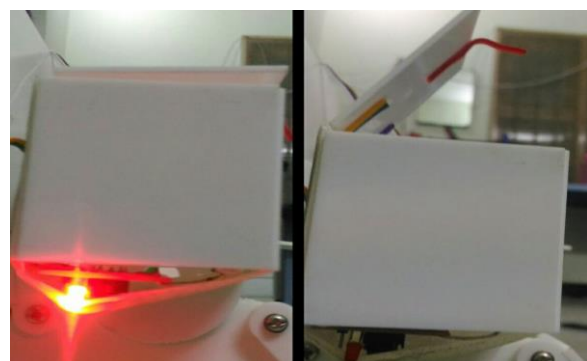
A switch is used the cal the timer and tasks , navigation tasks consists of UART task for serialinput and also 4 different tasks for driving the motor attacheto the controller.

B. Conversion system:

The conversion system consist of mainly a motor and 3 gears , It is used to convert the the wheelchair to bed and vice versa , the conversion depends on how the motor is driving clockwise or anticlockwise. it is used to improve the comfort of the patients.

C. Tabo kit system:

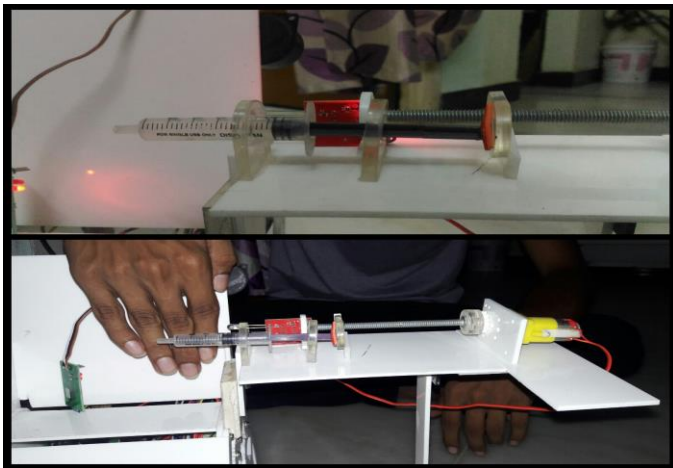
The tabo kit system consist of a box with ir sensor in it , they are mainly used to make sure the patients take their medicines in time , the buzzer produces a sound when it is time to take the medicine and stops only after the person takes the tablet from the box, The remaining count of the medicines available is also displayed in the lcd.



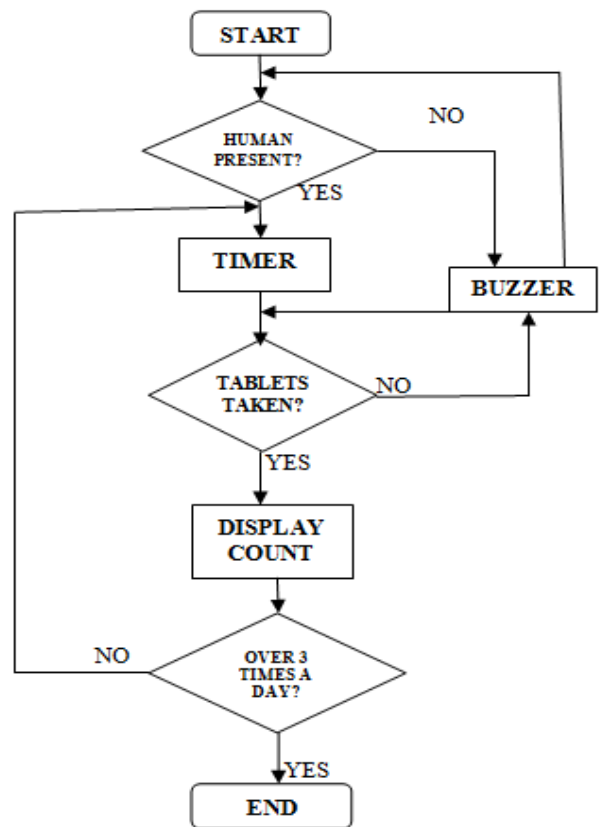
Fig[3]Tabokit

D. Insulin Injector system:

The insulin injector system is to make sure the patient takes the insulin in time, First the IR sensor senses the presence of human, if he is present then it produces a buzzer sound, Then it inserts the injection to the particular level and moves back

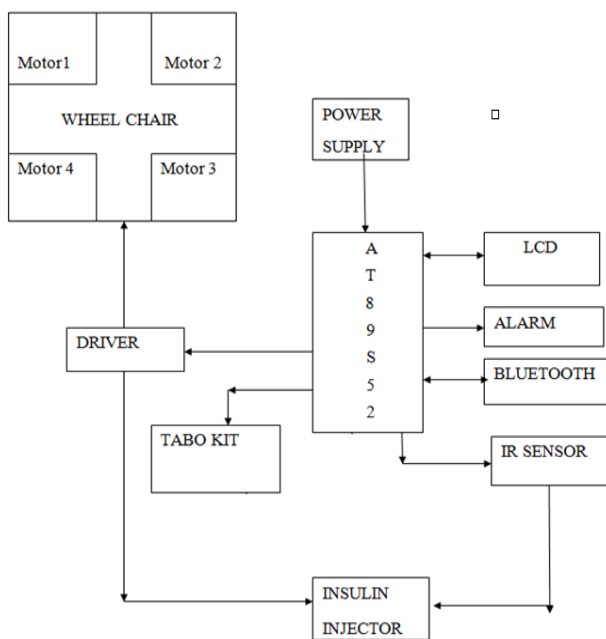


Fig[4]. Insulin injector

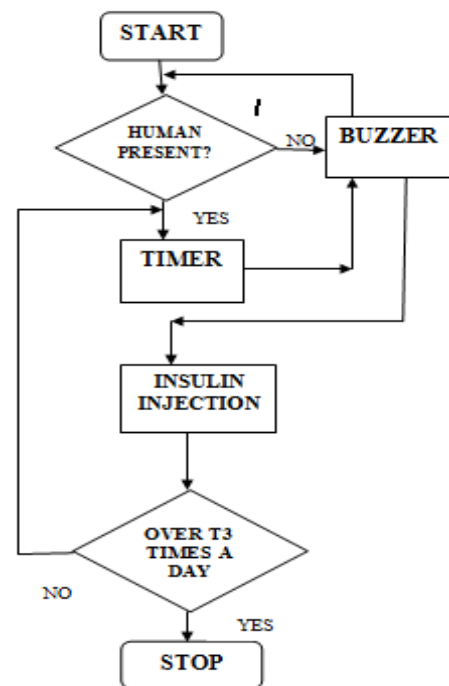


Fig[6]. Flow diagram of tabokit

3.DETAILED WORKING:



Fig[5]. Block diagram



Fig[7].Flow diagram of insulin injector

4.HARDWARE USED:

Microcontroller AT89S52:

The AT89S52 is a low-power, high-performance CMOS 8bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry.

Bluetooth Module:

The Bluetooth module HC-05 is a MASTER/SLAVE module. By default the factory setting is SLAVE. The Role of the module (Master or Slave) can be configured only by AT COMMANDS. The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections. Master module can initiate a connection to other devices.

The user can use it simply for a serial port replacement to establish connection between MCU and GPS, PC to your embedded project, etc. Just go through the datasheet for more details. The Bluetooth module HC-05 is a MASTER/SLAVE module. By default the factory setting is SLAVE. The Role of the module (Master or Slave) can be configured only by AT COMMANDS. The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections. Master module can initiate a connection to other devices. The user can use it simply for a serial port replacement to establish connection between MCU and GPS, PC to your embedded project, etc.

IR sensor:

Infrared radiation is an electromagnetic wave with wavelength of 700nm to 1 mm. It is emitted by objects with temperature above 0 kelvin. Furthermore intensity and wavelength of infrared radiation depends on the temperature of the object.

The infrared sensors are the sensors that detect/measure infrared radiation or change in the radiation from outer source or inbuilt source. Also sensors that uses the property of infrared radiations to detect the changes in surrounding are termed as infrared sensors.

Buzzer:

A **buzzer** or **beeper** is an audio signaling device,^[1] which may be mechanical, electromechanical, or piezoelectric.

DC motor:

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

LCD:

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.^[1] LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

B. Software modules:

Embedded c:

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address common issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.

Keil compiler:

Keil provides a broad range of development tools like ANSI C compiler, macro assemblers, debuggers and simulators, linkers, IDE, library managers, real-time operating systems and evaluation boards for Intel 8051, Intel MCS-251, ARM, and XC16x/C16x/ST10 families.

5.CONCLUSION:

Carevan produces a complete model of both movement of the people and also keeping track of their health , The use of android APP to connect to the RTOS makes ready use of the in-built android mobile functions and gives out one of the easiest way to navigate through mobile.The highlight features of the carevan is the wheelchair to bed conversion for increasing their comfort .The next feature of them is the tabokit which reminds them to take their tablets in time ,and also shows the remaining count .

The final feature is to help the diabetes patients which is common in todays world ,it helps them to take the injections in time , As a whole the carevan acts as a complete module which serves both as their movement partner and also as their medical partner which is to benefit maximum number of people to reduce their dependencies on others.

6.FUTURE WORK:

Currently the carevan concentrates on the people only when sitting on the wheelchair but in future in case the person has been out of the wheelchair then they will be provided by a wearable which consist of 1 tablet in it for emergency purpose so that can be used by them , In future we are planing to link the IOT in it to keep track of their health by adding extra feature like finding the heart rate or measuring the diabetes level and storing it in an app . And also the wheelchair can be more chanalised with latest technology movements. And also the use of GSM in it can u brought in.

7.REFERENCE:

1. Embedded system design for real-time interaction with Smart Wheelchair Doshi Siddharth P. VLSI and Embedded systems design, GTU PG SCHOOL, Gandhinagar presented at 2016 Symposium on Colossal Data Analysis and Networking (CDAN) .

2.“An Approach of Human - Smart Electric Wheelchair Interaction inIntelligent Space”, Mihoko Niitsuma, Terumichi Ochi, and MasahiroYamaguchi,[1] Hideki Hashimoto [2], : Dept. of Precision Mechanics, Chuo University, Tokyo, Japan [1], Institute of Industrial Science, TheUniversity ofTokyo, Tokyo, Japan [2], 2011 IEEE Conference, Japan.

3. “HOLDS: Efficient Fall Detection through Accelerometers and Computer Vision”, Antonio Fernández-Caballero, Marina V. Sokolova, Juan Serrano-Cuerda and José Carlos Castillo [1] , Verónica Moreno.

4. Rodrigo Castiñeira [2], Instituto de Investigación en Informática deAlbacete, Universidad de Castilla-La Mancha ,Departamento deSistemas Informáticos, 02071-Albacete, Spain [1] ,INETSIS, Madrid,Spain [2], IEEE 2012 Eighth International Conference on Intelligent Environments.

5.“Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface”, Amberlay Ruíz-Serrano, Miriam C.Reyes-Fernández, Rubén Posada-Gómez, Albino Martínez-Sibaja,Alberto A. Aguilar-Lasserre, División de estudios de posgrado einvestigación, Instituto Tecnológico de Orizaba, Orizaba,México,:IEEE2014 11th International Conference on Electrical Engineering,Computing Science and Automatic Control (CCE).

6. “Research of Fall Detection and Alarm Applications for the Elderly”,Wang Ye, Bai Xiang-yu College of Computer, Inner MongoliaUniversity, Hohhot, China.

7. “Smart Assistive Accident Free Wheelchair System (SAAFWS)”,George Freiha, Roger Achkar, Michel owayjan, Mohammad Mokhadder, Department of Computer and Communications Engineering, Faculty of Engineering, American University of Scienceand Technology, Beirut, Lebanon, : IEEE 2013 International Conferenceon Robotics, Biomimetics, Intelligent Computational Systems(ROBIONETICS) Yogyakarta, Indonesia, November 25-27,2013.

8.“The Human-Environment Interface Design with a Vision AssistanceModule for a Smart Wheelchair”, Han-Yen Yu, Jiann-Jone Chen and Chung-Hsien Kuo, National Taiwan University of Science andTechnology, Taipei 10673, Taiwan, IEEE 2014 Intelligent Conferenceon Advanced Robotics and Systems (ARIS-2014), June 6-8 2014.

9. S.-K. Kang, K.-Y. Chung and J.-H. Lee, “Development of headdetection and tracking systems for visual surveillance,” J. Personal and Ubiquitous Computing, pp. 515-522, Mar. 2014.